

**Note:**

**All new material objected to by the Examiner has been removed and all appropriate corrections made. The corrected version of the specification contains no new material.**

**In the Specification:**

**CROSS REFERENCE OF RELATED APPLICATIONS**

[0001] Pursuant to 35 U.S.C. Section 119, the benefit of priority from Provisional Application 60/223,569 with filing date 08/07/2000 is claimed for this Non-Provisional Application.

**BACKGROUND OF THE INVENTION**

**1. Technical Field**

[0002] This invention relates to the protective apparatus for the hands, and more particularly, multiple sleeves coupled to a palm apron for inserting multiple digits of the grasping hand of a user. The sleeves and palm apron provide for insulation of the fingers and contiguous part of the grasping hand from contact with the operative portions of doors, door handles and surfaces of public conveniences.

**2. Description of the Prior Art**

The use of devices for receiving a user's fingers for a variety of purposes is known in the prior art. More specifically, sleeves, cots and puncture resistant gloves for a wide variety of purposes heretofore devised and utilized for protecting the user from infectious diseases, corrosive or poisonous agents. Others have been developed to facilitate the grasping of objects by extending the effective lengths of fingers. Garrett-Roe in US Patent number 5,749,097 (1998) described a protective apparatus consisting of three sheaths tethered together for protecting two fingers and a thumb of the hand of a manicurist from solvents present during the natural discourse of the manicurist duties. Davis et. al. in U.S. Patent Number 4,796,302 (1988) disclosed a multi-finger guard with two sheaths for protecting the fingers from impacts. Kim in U.S. Patent Number 5,363,508 described a finger and palm guard for barbers and cosmetologists made up of a pair of tubular members or rings that accommodate the middle and index fingers of the user's hand. Attached to and extending from each of these members is a projection that extends over the palmar fascia in the region immediately adjacent to the knuckles joining the metacarpals and the third phalanges of both the middle and index fingers. The finger and palm guard is designed to prevent a path for the transmission of various diseases. Sullivan et. al. in U. S. Patent Number 5,087,499 disclosed a puncture-resistant and medicinal treatment garment.

[0003]In addition to the possible transmission of disease by sharp implements such as needles and surgical knives, the ecology of infection is complex and involves interactions with climate, food and water supply, arthropod vectors, animal contacts, and contact with objects handled by carriers of infectious diseases. In public facilities, such as

restrooms, it is the contact of the hands with objects that are touched or grasped by many users that can result in the spread of infectious disease. The washing of hands by workers in convenience food places is therefore encouraged or otherwise mandated.

[0004] It is an object of this invention to provide a protector for the preferred working hand from germs and other infectious agents resulting from exposure to contaminated surfaces during normal activities. A second object of this invention is to provide a multiple finger contamination protector that will receive without assistance the thumb and a multiplicity of adjacent fingers of a working hand. A still further objective of this invention is to provide a palm and finger protector, which is contact-coated with fungicide and disinfectant agents, that prevent the vectoring of a fungi and a virus to the hand of a wearer. Other objects of this invention will become apparent during a reading of the detailed description of the invention.

## **SUMMARY OF THE INVENTION**

[0005] An apparatus for protecting the operable part of a working hand comprises multiple finger sleeves, a palm shield, and a sheath for receiving the hand protecting apparatus. The sleeves can be composed of hydrophobic polymeric or other materials coated or otherwise laden with disinfecting or pharmaceutical agents for destroying disease causing virus inter alia. The hand protector is designed to be attached separately or in a sheath in a non-obtrusive position on

an element of clothing of a user such that only the hand to be protected is required to employ the hand protector for use.

### **DETAILED LIST OF FIGURES**

[0006] FIG.1 is a plan view of the apparatus of this invention shown as it would be deployed on the hand of a user.

[0007] FIG.2 is a side view of the device of this invention deployed on the belt of a user.

[0008] FIG.3 shows a second embodiment of the device of this invention complete with a receiving sheath and mounted on the belt of a user.

[0009] FIG. 4 shows the device of this invention where the number of sleeves equals the number of fingers of the grasping hand.

[0010] FIG. 5 shows the device of this invention where two sleeves are used to shield the fingers from contaminated surfaces.

### **DETAILED DESCRIPTION OF THE INVENTION**

[0011]Referring now to the figures and more particularly to FIG. 1, a sketch according to one embodiment of the palm and finger protector of the present invention as referenced by the numeral 2. The palm and finger protector referenced by the numeral 2 has palm apron 14 which is attached to the finger sleeves 8, 6, and 4 proximate their first ends using first terminal edge 15a of palm apron 14 as shown in FIGS. 1 and 2. Throughout

this application, the palm and finger protector may be referred to interchangeably via the phrase "protective shield". The first face 16 of apron 14 is for contacting surfaces while the second face 17 contacts the user's palm. In FIGS. 1 and 2, the finger sleeves 4 through 8 are attached to the apron via adhesive 10 (not shown in FIG. 1). It should be understood, however, that the fingers and apron could have been made in one integral unit. Also, they could have been joined by sewing the finger sleeves to the first terminal edge of the apron. The finger sleeves 8, 6 and 4 are designed to receive the thumb, index and middle fingers at their open first ends 5, 7 and 9 of FIG. 2, respectively. When employed on a hand, the sleeves 4, 6 and 8 and the first face 16 of the apron prevent the physical contact between the palm and fingers with surfaces in public use. The palm apron and finger sleeves of the device of this invention were made of plastic. However, even though the initial finger and palm protectors were made of plastic, they could just as well been made of rubber, organic or other polymeric materials. They could have also been made of a combination of the aforementioned materials. Returning to the protective shield of this invention, the closed distal ends of finger sleeves 8, 6 and 4 are set at linear distances from their open first ends that substantially parallel the average relative differences in the lengths of fingers of adults. Likewise, the closed distal ends of finger sleeves 8, 6 and 4 are set at linear distances from their open first ends that substantially parallel the average relative differences in the lengths of fingers of children. The open first ends 5, 7 and 9 are defined by rings 11a, 11b, 11c which are embedded in plastic finger sleeves 8, 6 and 4 (see FIGS. 1 and 2) near the open first ends of the sleeves 8, 6, and 4. Rings 12 a and b which are not connected to sleeves, serve to help hold the apron 14 second face 17 in good contact with the

surface of the palm of a hand. When the protective shield is mounted on the hand, phalanges 3 are inserted through rings 12a and 12b. The inclination of the plastic rings 11a, 11b and 11c is set such that the plastic rings at the open first ends 5, 7 and 9 are displaced linearly in a manner substantially identical to the relative position of the heel of the thumb to the knuckles of the index and middle fingers. The angle of the plane containing the thumb ring 11a is essentially at a right angle relative to the plane containing the rings 11b and 11c for the index and middle fingers, respectively. Rings 11a through 11c provide for easy insertion of the fingers of the users. The outer surface 18 of the finger sleeves 8, 6 and 4 and that of palm apron 14 are coated with a disinfectant or a fungicide (not shown in the FIG.1). The disinfectant could be any of a number of chemicals, anti disease and viral destructive agents. For example, any disinfecting and pharmaceutical agents that are compatible with plastics may be used. Furthermore any known conventional means of coating the various types of disinfecting and pharmaceutical agents on plastics may be used. Depending whether or not the palm and finger protector is a disposal unit, the manner and type of disinfectant or pharmaceutical agent will be chosen accordingly. The disinfecting agent and the fungicide can be applied with commercially available bonding agents for coating or binding active elements to a surface. The disinfectant and/or fungicide can also be immersed in the fabric or material of construction of the protective shield. Throughout this specification the inventors have described a palm and finger protector that make use of a disinfectant inter alia added to its surface or immersed in its material of construction. However, a disposable palm and finger protector could provide a barrier to viruses and infectious disease transmission with and without the conjunctive use of a disinfectant or

chemical agent. The hand shields of FIGS. 1 and 2 are shown attached to belt 24 of a user in FIG.2. It could, however, be kept for ready use and safekeeping in an independent container wherefrom it is removed only when needed. In the case of disposable shields, a plurality of shields may be housed in a single container.

[0012]FIG. 2 shows the palm and finger protector of this invention, as it could be stored on a user. The palm and finger protector could be suspended in a front or rear pocket or the side belt area 22 of a skirt, dress or pants. In any case, the second edge 23 of apron 14 (FIGS.1 and 2) may be attached to a wearer's belt as shown in FIG. 2 as by mating hook and loop fabrics fasteners 26a and 26b, respectively. Loop 26a may be mechanically attached to a host belt or garment while loop 26b is attached to the first surface 16 of apron 14 near its second edge 23. As mentioned previously, both apron 14 and finger sleeves 8, 6 and 4 were composed of plastic. However, any type of fiber, whether they are the high strength polymeric type, conventional fabrics or combinations of both, may be utilized to fabricate the apparatus of this invention. A wide variety of materials could be used in manufacturing the finger and palm protector, depending on whether it was desired to have the protector to be reusable or disposable. Various types of plastics, metal, leather, or combinations thereof are contemplated. The use of fiber construction can be used to enhance the absorption of the disinfectants or pharmaceutical agents to increase the effective lifetime of the finger and palm protector. For example, a 10% solution of 1-ethenyl-2-pyrrolidinone homopolymer with iodine and 1-vinyl-2-pyrrolidinone polymers in an iodine complex would make an adequate disinfectant. The disinfectant could be an integral part of the polymeric materials. While the

aforementioned disinfectant is a liquid, other disinfectants could be made in a powder form. In FIGS. 1 and 2, particularly FIG.2, it is clear that the finger and palm shield of this invention protects only those fingers covered with sleeves and the palm of the working hand. The palm protector covers that portion of the palm in contact with second face 17 of the protective shield..

[0013]A second embodiment of the device of this invention is shown in FIG. 3. The second embodiment of FIG. 3 shows absorber 28 as it is disposed in the interior of sheath 30 in contact with palm and finger protector 2' as it would be positioned during non use within sheath 30. Sheath 30 is composed of a liquid impervious material having a first part 31 with first and second surfaces 31a and 31b, respectively, and a second part 33 that are mechanically held together in non leaking contact as by adhesive (not shown in FIG. 3) or by stitching (not shown in FIG.3) so as to form pocket 35. Part 33 consists of first and second surfaces 33a and 33b, respectively. In the second embodiment of this invention, absorber 28 is attached to the entire second face 31b of part 31 a substantial portion of the first surface 33a of part 33. Hoop fastener 32a is attached to the second surface of part 33 at its first end 34. The mating loop fastener 32b is held by adhesive or other mechanical methods to belt 24'. The sheath 30 is thereby attached to the belt 24' of the user. The hook and loop fastener 26a' and 26b' function as described previously. However, in this case loop 26b is attached by adhesive to the second surface 33b of part 33. It should be clear that the loop fastener 32b could have been attached at other positions on the body to an article of clothing. Absorber 28, which may be impregnated with disinfectant and/or pharmaceutical agents which are designed to coat the grasping



surfaces of the finger sleeves 8', 6', and 4' (not shown in FIG. 3) and the first face 16 (not shown in FIG.3) of apron 14 such that the effective disease and virus fighting capability of the protector is rejuvenated each time it is placed in sheath 30. The absorber 28 is encased over substantially the full inner surface of sheath 30. Together the protective shield 2 and sheath 30 form an assembly that rejuvenates the active disease and virus fighting strength of the system after each use. The disinfectant and pharmaceutical agents may be added to the absorber when needed via a standard commercial container.

[0014]The use and function of the apparatus of this invention will now be discussed. In this case, the user, utilizing the apparatus of the first embodiment, inserts the thumb index and middle fingers into the sleeves and breaks the bonding of loop 26b to hook 26a. The palm and finger protector 2 is now ready for use. The user can now grasp a surface without fear of exposure to dangerous viruses and disease.

[0015]The purpose and design of the device of this invention have been discussed in clear detail that would make clear the claimed invention. The invention is susceptible to variations and modifications from the embodiments, materials and methods of fabrication described herein. For example, the finger sheaths may include all the fingers of the grasping hand as shown in FIG.4. Likewise they could be made of highly absorbent paper fibrous materials.

[0016] Several different variations and/or modifications of the present invention are possible from the embodiments and method of fabrication described above. For example, the number of sleeves may be changed. In Fig. 5, the first end of sleeve 36 contains plastic rings 11b, 11c, 12b and 12a that are designed to accept the insertion of four fingers. Ring 11a provides a single ring for the thumb. Finally, the user need not carry the protective shield on his/her person. The protective shield (s) may be transported in a separate container. In view of these facts, it should be understood that the present invention is limited only by the scope of the claims presented below.